

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
31 January 2002 (31.01.2002)

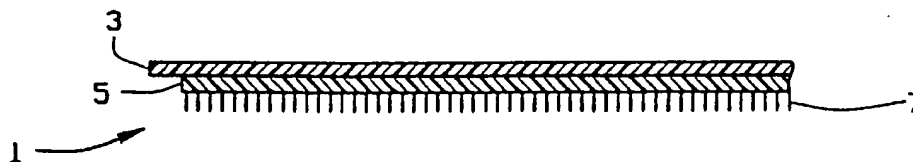
PCT

(10) International Publication Number
WO 02/07959 A1

- (51) International Patent Classification⁷: B32B 5/00, 3/02, 33/00, 15/04, 7/12, B41M 3/12, B05D 1/14, 1/16, 5/10
- (74) Agent: DENK, Paul, M.; 763 South New Ballas Road, St. Louis, MO 63141 (US).
- (21) International Application Number: PCT/US01/23195
- (81) Designated States (*national*): AU, CA, CN, ID, IL, IN, JP, KR, MX, SG, ZA.
- (22) International Filing Date: 23 July 2001 (23.07.2001)
- (25) Filing Language: English
- (84) Designated States (*regional*): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).
- (26) Publication Language: English
- (30) Priority Data: 09/621,830 24 July 2000 (24.07.2000) US
- Published: — with international search report
- (71) Applicant and
- (72) Inventor: ABRAMS, Louis, B. [US/US]; P.O. Box 41, Fort Collins, CO 80522-0041 (US).
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*



(54) Title: FLOCKED TRANSFER AND ARTICLE OF MANUFACTURE INCLUDING THE FLOCKED TRANSFER



(57) Abstract: A flocked transfer (1) is produced by applying a release agent (5) to a release sheet (3) and then applying the flocking to the release agent (5). Unlike the traditional method, a binder and hot melt film is not applied to the back of the flock. The transfer (1) (which is essentially a flocked release sheet) is then applied to a substrate i.e. an item of clothing, a rubber pad, etc. by positioning a sheet of the thermosetting hot melt film on the substrate; placing the transfer on the hot melt film with the flock in contact with the hot melt film; and applying heat and pressure. The heat melts the thermosetting hot melt film to bind the flock to the substrate and binds the flocking together. This method reduces the costs involved in producing flocked articles.

WO 02/07959 A1

FLOCKED TRANSFER AND ARTICLE OF MANUFACTURE INCLUDING THE FLOCKED TRANSFER

Technical Field

This invention relates to flocked transfers, and, in particular, to an
5 improved method of making flocked transfers which can reduce the cost
and time required of producing transfers by a significant amount.

Background Art

Heretofore, flocked transfers have generally been produced by
applying a release agent to a release sheet. The flocking is applied to
10 the release sheet in the desired pattern. A binder and a permanent hot
melt adhesive are applied to the back of the flocking, and the transfer is
allowed to dry. The binder is required hold the flocking in the desired
pattern. The hot melt adhesive, which is applied to the transfer as a
powder, is used to adhere the transfer to a substrate, such as an article
15 of clothing, a neoprene pad, etc. The transfer is applied to the substrate
by placing the transfer on the substrate with the dried hot melt adhesive
in contact with the substrate. Heat, such as from an iron, is then applied
to the release sheet. The heat melts the hot melt adhesive to cause hot
melt adhesive to flow into intimate contact with the substrate, forming a
20 mechanical and molecular bond with the substrate. The release agent
then allows for the release sheet to be removed from the transfer,
leaving the flocking exposed on the substrate.

This traditional method has worked well for years. However, the
method can be improved upon to reduce the cost of producing the
25 transfer, and hence, the cost of the item containing the transfer.

Summary of the Invention

In accordance with the invention, generally stated, a flocked
transfer of the present invention is produced by applying a release agent
to a release sheet and then applying the flocking to the release agent.
30 Unlike the traditional method, a binder and adhesive are not applied to
the ends of the flock.

- 2 -

To form an article of manufacture with the flocked transfer, a hot melt film (in the form of a sheet or cut to shape) is positioned on the substrate to which the transfer is to be applied. The hot melt film is preferably a polyester or polyurethane film, but can be any thermosetting film. The flock with the release adhesive and release sheet (i.e., the transfer) is then placed on the sheet of hot melt film with the release sheet up, so that the flocking is in contact with the hot melt film. Heat is then applied to the transfer. The heat melts the hot melt film, and secures the flock to the substrate.

10 Brief Description of the Drawings

FIG. 1 is a cross-sectional view of a prior art flock transfer;

FIG. 2 is a cross-sectional view of a flock transfer of the present invention;

15 FIG. 3 is an exploded view of the transfer, a hot melt sheet, and a substrate used to make an article of manufacture;

FIG. 4 is a cross-sectional view of an article of manufacture using the transfer of the present invention, showing a part of the transfer applied to part of the substrate and a part of the transfer and hot melt film spaced from the substrate; and,

20 FIG. 5 is a schematic drawing of a process for continuously producing articles of manufacture, such as mouse pads, coasters, etc.

Corresponding reference numerals will be used throughout the several figures of the drawings.

Best Mode for Carrying Out the Invention

25 The following detailed description illustrates the invention by way of example and not by way of limitation. This description will clearly enable one skilled in the art to make and use the invention, including what I presently believe is the best mode of carrying out the invention.

30 A prior art flocked transfer 101 is shown in FIG. 1. As is known, such transfers include a dimensionally stable release sheet 103 to which a conventional flock transfer release adhesive 105 is applied in a pattern which corresponds to the overall image to be flocked. The flock 107 is

- 3 -

then electrostatically coated into the release adhesive 105. A binder adhesive 109 is applied to the exposed ends of the flock to bind the flock together as a unit. Lastly, a hot melt adhesive 111 is applied. The transfer is then allowed to dry. The transfer is applied to a substrate, as
5 is known, by positioning the transfer on a substrate, such as a shirt or other item of clothing, with the hot melt adhesive in contact with the substrate, and applying heat to the transfer. The heat activates the hot melt adhesive to adhere the transfer to the substrate. This process is described in my prior patent, U.S. Pat. No. 4,810,549, as well as in my
10 co-pending application, Ser. No. 09/548,839 filed April 13, 2000, both of which are incorporated herein by reference.

A flocked transfer 1 of the present invention is shown in FIG. 2. The transfer 1 of the present invention includes a release sheet 3 to which a conventional release agent 5, such as wax, has been applied.
15 The release agent is applied to the sheet in the shape of the pattern of the flocking. Flocking 7 is then applied to the release agent, and hence to the release sheet, to form the transfer. The flocking 7 is applied, for example, in the manner as described in my prior patent, U.S. Pat. No. 4,810,549, which is incorporated herein by reference. Unlike the prior
20 art processes, the transfer 1 is made without the use of a binder adhesive or a hot melt adhesive. As is discussed below, a thermosetting film is used to adhere the transfer to a substrate.

An article of manufacture, such as an item of clothing having a transfer 1 applied thereto, a mouse pad, coaster, or other item having a
25 flocked surface is easily produced using the transfer 1. The article of manufacture 11 is produced by positioning a hot melt sheet 13 between a substrate 15 and the flocked release sheet. The hot melt sheet is, for example, a sheet of thermosetting polyester, available from Bostik, Inc. The hot melt sheet can also be made from a thermosetting
30 polyurethane. Any other thermosetting film should also work well. The substrate can be an item of clothing, a rubber pad (for producing a mouse pad or coaster), etc. The hot melt sheet can be precut to

- 4 -

correspond to the shape of the transfer 1. The transfer 1 is then positioned on the hot melt sheet with the flock 5 against the hot melt sheet 13. Heat is applied to the transfer through the release sheet to activate the hot melt sheet. The hot melt sheet then acts to both bind
5 the flock 5 together and to adhere the flock 5 to the substrate 15. Preferably, to assemble the article, the flocked release sheet, the thermosetting film, and the substrate are brought together and passed through a heat-laminating press where the three parts are subject to temperature of about 300°F (about 150°C) and pressure (about ____
10 lbs.) for about 30 seconds. The pressure and heat will cause the hot melt film to adhere to the flock and the substrate. Additionally, the hot melt film will cross-link or cure, to give a strong attachment of the flock to the substrate.

Articles, such as mouse pads or coaster, in which the entire top
15 surface of the article is covered with the flocking can be produced on a continuous basis, as shown in FIG. 5. Rolls 21, 23, and 25 of a flocked release sheet 1, the hot melt film 13, and the substrate 15 are provided. The three parts are brought together at a laminating station 33. Rollers can be provided in front of the station 33 so that the three elements are
20 adjacent each other as they enter the laminating station. In the laminating station, heat and pressure are applied to the three sheets (the flocked release sheet, the hot melt film, and the substrate) to melt the hot melt film. The melted hot melt film will then cure or cross-link, as noted above, to adhere the flock to the substrate. A web 35 exits the
25 laminating station. The web 35 is then allowed to cool. The web 35 is ultimately directed to a cutting station where it is cut into individual articles. Once the web 35 is cooled, it can be directed immediately to a cutting station (after the sheet 35 cools), or can it can be wound up on an uptake roller to be cut into individual articles at a later time, or at a
30 different location. At the cutting station, the release sheet is removed from the flock and gathered on an uptake roll or is otherwise disposed

of. After the release sheet has been removed from the flock, the substrate with the flock adhered thereto is cut to form the articles 11

Preferably, the release sheet is flocked and supplied in roll form as shown in FIG. 5. However, the flocking of the release sheet could be
5 made part of the process.

To produce flocked articles, such as shirts, jackets, etc., which cannot be easily flocked on a continuous basis, the hot melt sheet can be applied to the transfer 1 prior to applying the transfer to the substrate. To do this, the thermosetting hot melt film is placed in
10 contact with the flock of the transfer, and the transfer and release sheet are heated to a temperature at which the thermosetting hot melt film become tacky, but below the temperature at which the thermosetting hot melt film begins to cure and cross-link. This will adhere the thermosetting hot melt film to the transfer 1 to form a transfer which can
15 later be applied to an article by positioned the transfer with the hot melt film in position on the article (i.e., piece of clothing) and applying heat and pressure to the transfer, for example, with an iron, sufficient to melt the hot melt film, to cause the hot melt film to cure and cross-link.

The method eliminates two steps from the prior art method: (1)
20 application of the binder adhesive and (2) application, cleaning, sintering, and drying of the hot melt adhesive. In a continuous process, the present method also eliminates a station for applying the binder and hot melt adhesives as well as a station for drying the completed transfer. Because a station is not needed to apply (i.e., print) the binder and hot
25 melt adhesives to the flocking as part of the transfer, the machinery required to produce the article 11 is much less expensive (both in actual costs and in maintenance costs). Additionally, because the binder adhesive and hot melt adhesive is not used, the cost of the article of manufacture is significantly reduced.

30 As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all

matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Claims

1. A flocked transfer consisting essentially of a release sheet,
a release agent on the release sheet, and flock on the release agent;
the flock being formed in a desired pattern; the release agent holding the
5 flock to the release sheet.
2. An article of manufacture including the transfer of Claim 1
wherein the transfer is adhered to a substrate.
3. The article of manufacture of Claim 2 wherein the transfer
is adhered to the substrate using a thermosetting hot melt sheet.
- 10 4. The article of claim 3 wherein the thermosetting film is a
thermosetting polyurethane film or a thermosetting polyester film.
- 5 A method of producing an article of manufacture having a
flocked surface; the method comprising:
supplying a flocked release sheet comprising a release sheet with
15 flock adhered thereto;
adhering a thermosetting hot melt film to the flock of the flocked
release sheet; and
adhering the thermosetting hot melt film to a substrate to adhere
the flock to the substrate.
- 20 6. The method of claim 5 wherein the step of adhering the
thermosetting hot melt film to the flocked release sheet comprises
heating the thermosetting hot melt film to a temperature at which the hot
melt film becomes tacky, but below a temperature at which the hot melt
film begins to cure and cross-link.
- 25 7. The method of claim 5 wherein the step of adhering the
thermosetting hot melt film to the substrate comprises heating the hot
melt film to a temperature at which the hot melt film cures and cross-
links.
8. The method of Claim 7 wherein the hot melt film is heated
30 to about 300°F.
9. The method of claim 5 wherein the step of adhering the
thermosetting hot melt film to the flocked release sheet and the step of

adhering the thermosetting hot melt film to the substrate are performed in a substantially simultaneously in a single operation.

10. The method of claim 5 wherein the method is continuous.

11. The method of claim 5 wherein the thermosetting film is a
5 thermosetting polyurethane film or a thermosetting polyester film.

12. A method for continuously producing an article of manufacture having a flocked surface; the method comprising:

providing flocked release sheet consisting essentially of a release sheet with flock applied thereto;

10 providing a thermosetting hot melt film;

providing a substrate;

bringing the substrate, thermosetting hot melt film and flocked release sheet together with the hot melt film between the release sheet and the substrate and with the flock in contact with the thermosetting hot
15 melt film, to produce a pre-assembly;

applying heat to the pre-assembly to adhere the flocking to the substrate; and

removing the release sheet from the flocking to produce a flocked substrate.

20 13. The method of claim 12 including a step of applying pressure to the pre-assembly.

14. The method of claim 12 wherein the step of applying heat comprises heating the pre-assembly to about 300°F.

15 15. The method of claim 12 wherein the thermosetting hot melt film is a thermosetting polyester or a thermosetting polyurethane.

16. The method of claim 12 including a step of cutting the flocked substrate to desired lengths to form articles.

17. The method of claim 12 including a step of collecting the flocked substrate on a product roll.

30

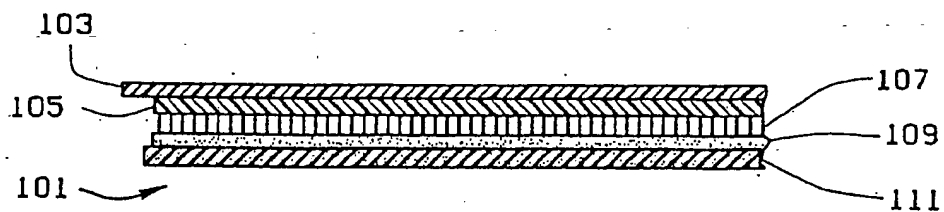


FIG. 1
PRIOR ART

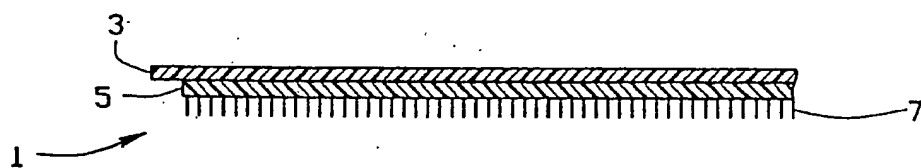


FIG. 2

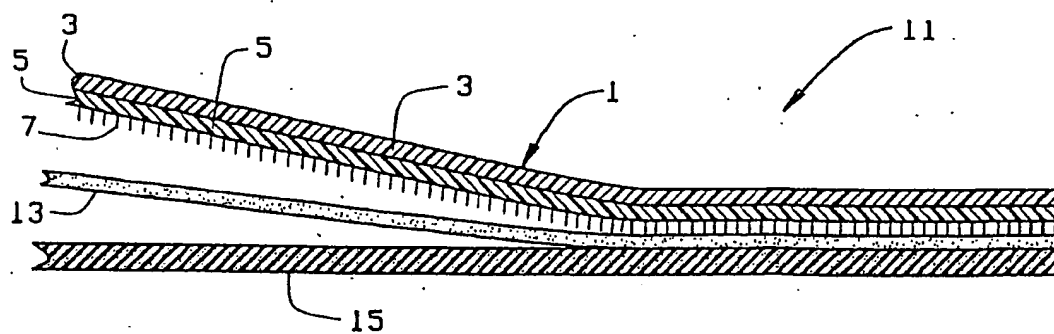


FIG. 4

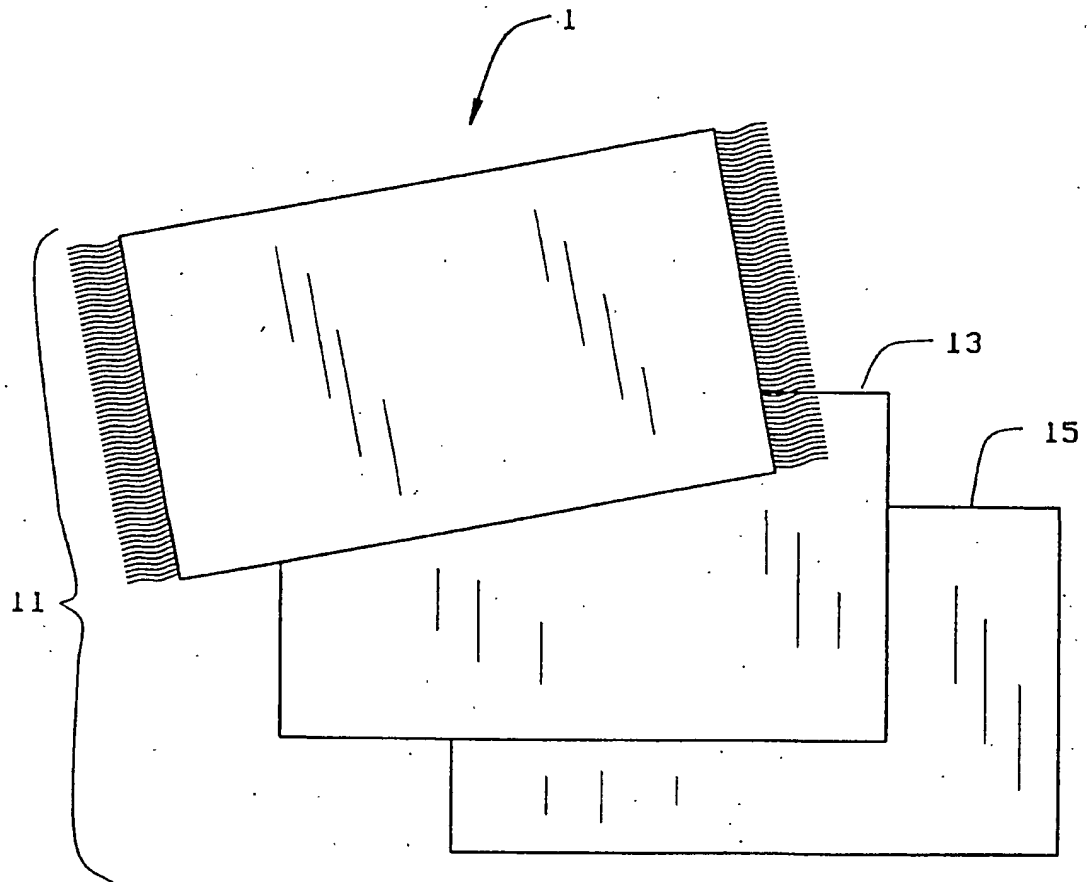


FIG. 3

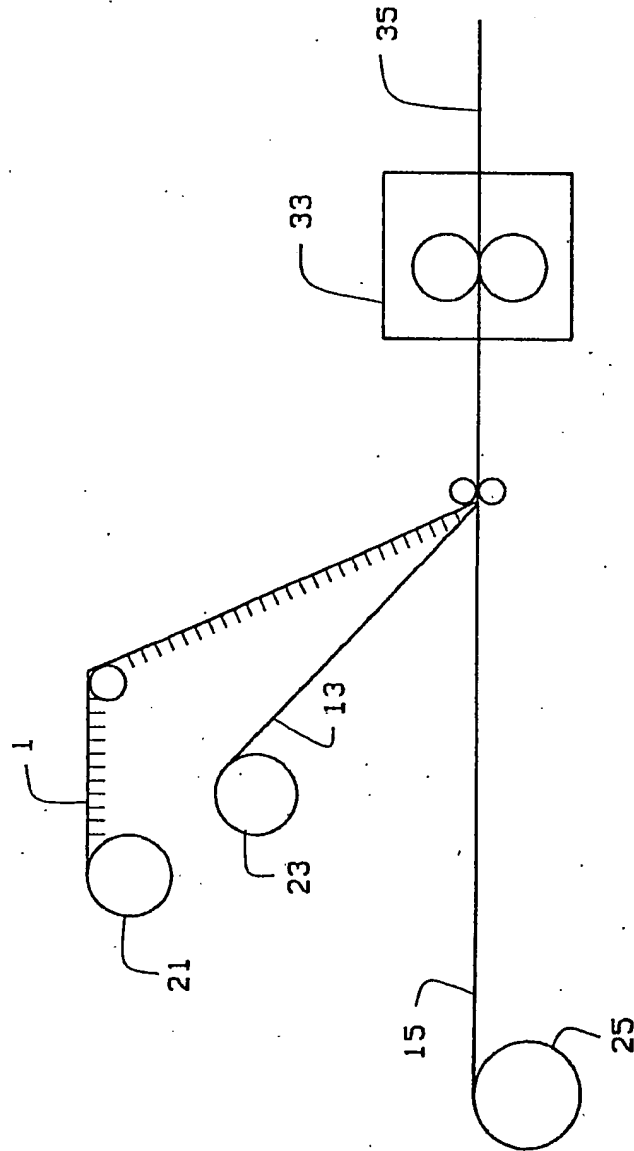


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/23195

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : Please See Extra Sheet.

US CL : Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US 6,224,707 B1 (LION) 01 May 2001, see entire document.	1-17
A,P	US 6,110,560 A (ABRAMS) 29 August 2000, see entire document.	1-17
Y	US 5,597,637A (ABRAMS et al.) 28 January 1997, see entire document.	1-17
—		—
A		1-17
A	US 4,810,549 A (ABRAMS et al.) 07 March 1989, see entire document.	1-17

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Z" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 17 SEPTEMBER 2001	Date of mailing of the international search report 30 OCT 2001
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer MS. ARTI SINGH <i>Arti Singh</i> Telephone No. 703-308-0661

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/29195

A. CLASSIFICATION OF SUBJECT MATTER:

IPC (7):

B 32 B 5/00,3/02, 33/00, 15/04,7/12;

B 41 M 3/12;

B 05 D 1/14,1/16,5/10.

A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

156/72;

428/85,90,41.7,41.8,42.1,343,346,353,352,348,347,914;

427/200,206,207.1,208.2.

B. FIELDS SEARCHED

Minimum documentation searched

Classification System: U.S.

156/72;

428/85,90,41.7,41.8,42.1,343,346,353,352,348,347,914;

427/200,206,207.1,208.2.